

Physics Review

Short Answer

1. Round the following values to a certainty of four significant digits.
 - a. 47.8945
 - b. 1009.9
 - c. 0.003 972 9
2. In your own words, state the rule for determining the number of decimal places in an answer calculated by subtracting two numbers.
3. Determine the number of significant digits for each of the following:
 - a. 5 scooters
 - b. 1 000.0
 - c. 0.000 004 5
 - d. 450
4. Calculate the area of a rectangular yard that is measured to be 15.2 m wide and 17.45 m long. Your answer should have the correct number of significant digits.
5. A speed limit in a city or town, unless otherwise posted, is 50 km/h. Convert 50 km/h into metres per second.
6. Solve for A using the given defining equation $V = 1/3 Ah$
7. Complete the Analysis and Evaluation in the following lab report.

What is the speed of Hank's bike over 100 m?

Several of Hank's friends are positioned 20.0 m apart with stopwatches. All the friends start their stopwatches when Hank starts to pedal his bike in a straight line. Each friend stops her watch when Hank reaches her position.

Evidence

Hank's Bike Ride	
Distance (m)	Time (s)
0.0	0.0
20.0	6.0
40.0	9.0
60.0	16.0
80.0	19.0
100.0	25.0

- a. Plot a distance-time graph of Hank's bike ride.
 - b. Calculate the slope of the best-fit line and answer the Question.
 - c. Evaluate the design. What alternative design would be more efficient?
8. A VW Beetle is travelling down the road at 40 km/h when the driver suddenly notices a roadblock 75 m up ahead. She applies the brakes as soon as she notices the roadblock. Her reaction time is 0.40 seconds.
 - a. Convert 45 km/h to metres per second (m/s).
 - b. Calculate the distance she travels in the 0.4 seconds it takes her to apply the brakes.

9. The speed of sound in air is 332 m/s at 0 degrees Celsius. At 0 degrees Celsius, a student bangs two blocks of wood together, causing a very loud bang, in order to carry out an experiment to measure the speed of sound in air. It takes 0.500 seconds for the sound to travel from the wooden blocks to the wall and return to the student with the wooden blocks. How far is the student from the wall?
10. In 1979, Bryan Allen pedalled the *Gossamer Albatross* aircraft 35.0 km across the English Channel in a time of 169 minutes.
 - (a) Calculate the average speed of the aircraft in km/h.
 - (b) Assuming that he maintained this same average speed, what total distance could he cover in 5.3 hours?
11. You are taking a trip from Oshawa to Niagara Falls in your family car. The total distance from Oshawa to Niagara Falls is 170 km. In the pursuit of science, you decide to measure certain physical quantities. The odometer on the car reads 28 456.0 km at the beginning of the time interval measured, and at the end of the time interval of 1.35 hours it reads 28 577.5 km.
 - (a) Determine the average speed of the car during this time period in kilometres per hour.
 - (b) Assuming this average speed will be maintained, how long will it take to travel to Niagara Falls from Oshawa in hours?
12. Sketch the following distance-time graph. A bike rider travels at a constant speed of 5.0 m/s for 6 seconds and then suddenly stops for 2 seconds.
13. Use distance and time to describe constant speed.
14. Use distance and time to describe a car that is speeding up.
15. Use distance and time to describe slowing down.
16. A jet is taking off. It is moving at 10.00 km/h and accelerates to 1 000 km/h² for 30.0 s. What is the final speed at the end of the 30.0 s?
17. A roller blader is skating down a hill at 4.0 m/s and accelerates to 15.0 m/s in a time of 5.2 s.
 - a. Calculate the average acceleration of the roller blader.
 - b. What does this acceleration mean?
18. A shark travelling at 2.0 m/s accelerates at 4.3 m/s² to a final speed of 15.0 m/s. What is the elapsed time during the acceleration?
19. A baseball player is stealing second base travelling at 4.0 m/s and accelerating at 2.0 m/s² for 3.0 s. What is the final speed at the end of the 3.0 s?
20. a. Plot the following tables on two separate speed-time graphs.

Karen's Acceleration	
Speed (m/s)	Time (s)
3.0	0.0
6.0	2.0
9.0	4.0
12.0	6.0

Jamal's Acceleration	
Speed (m/s)	Time (s)
0.0	0.0
1.5	3.0
3.0	6.0
4.5	9.0

- b. From the graphs calculate Karen's and Jamal's accelerations. Who has the greater acceleration?
21. How can you tell from a speed-time graph if an object is accelerating?